470350

# FLOOD INSURANCE STUDY

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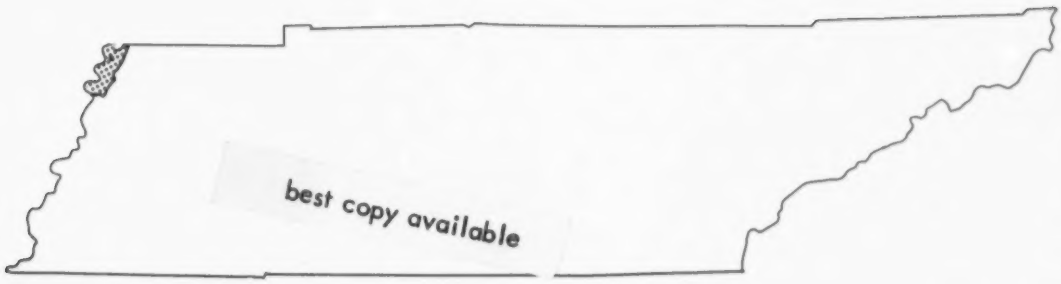
## CITY OF TIPTONVILLE, TENNESSEE
### LAKE COUNTY



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SEPTEMBER 16, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 470350

FEMA 1.209:

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FLOOD INSURANCE STUDY
CITY OF TIPTONVILLE, TENNESSEE

# 1.0 INTRODUCTION

## 1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Tiptonville, Lake County, Tennessee, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Tiptonville to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

## 1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the joint venture of Pickering, Wooten, Smith and Weiss, Inc., and Marvin W. White-Joseph D. Haas, Consulting Engineers, for the Federal Insurance Administration, under Contract No. H-4618. This study was completed in August 1979.

## 1.3 Coordination

Streams and lake shore requiring detailed study were identified at a meeting attended by representatives of the study contractor, the FIA, and the City of Tiptonville, in March 1978. Results of the hydraulic analysis were coordinated with the U.S. Department of Agriculture, Soil Conservation Service (SCS), U.S. Geolgoical Survey (USGS), and the U.S. Army Corps of Engineers (COE).

On April 2, 1980 the results of the study were reviewed at a final coordination meeting attended by representatives from the study contractor, the FIA, and the City of Tiptonville.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the City of Tiptonville. The area of study is shown on the Vicinity Map (Figure 1).

Floods caused by the overflow of the Old Tramway Ditch north of Tiptonville and the shores of Reelfoot Lake were studied in detail.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through March 1983.

### 2.2 Community Description

Tiptonville is located in Lake County in the northwest corner of Tennessee. The total area contained within the city is 1.1 square miles.

The city is situated approximately 90 miles northeast of Memphis, Tennessee, and 70 miles southwest of Paducah, Kentucky. The population of Tiptonville increased from 2068 in 1960 to an estimated population of 2145 in 1976.

Annual rainfall varies from 35 to 70 inches averaging slightly less than 50 inches. Normal monthly rainfall varies from 3.48 inches during late summer or early fall, to 5.16 inches during winter or spring. The Mississippi River meanders generally south-south-westwardly along the western boundary of Tiptonville.

Graveyard Slough is the remaining drainway which follows the course of the deep channel along the east shore of the Mississippi River where it reaches its most eastern meander in recorded history.

During low water stages on the Mississippi River the watershed area for Graveyard Slough above Tiptonville is 6560 acres, the only significance of which relates to backswamp drainage during low water seasons of the river. This watershed includes Island No. 12, Silvertop Towhead, and the northern part of Tiptonville Towhead, all of which are submerged before the river reaches bankfull stage.

The Old Tramway Ditch flows 6600 feet westwardly about 1000 feet north of most of the Tiptonville corporate limits into Graveyard Slough. The drainage area is slightly less than one square mile.

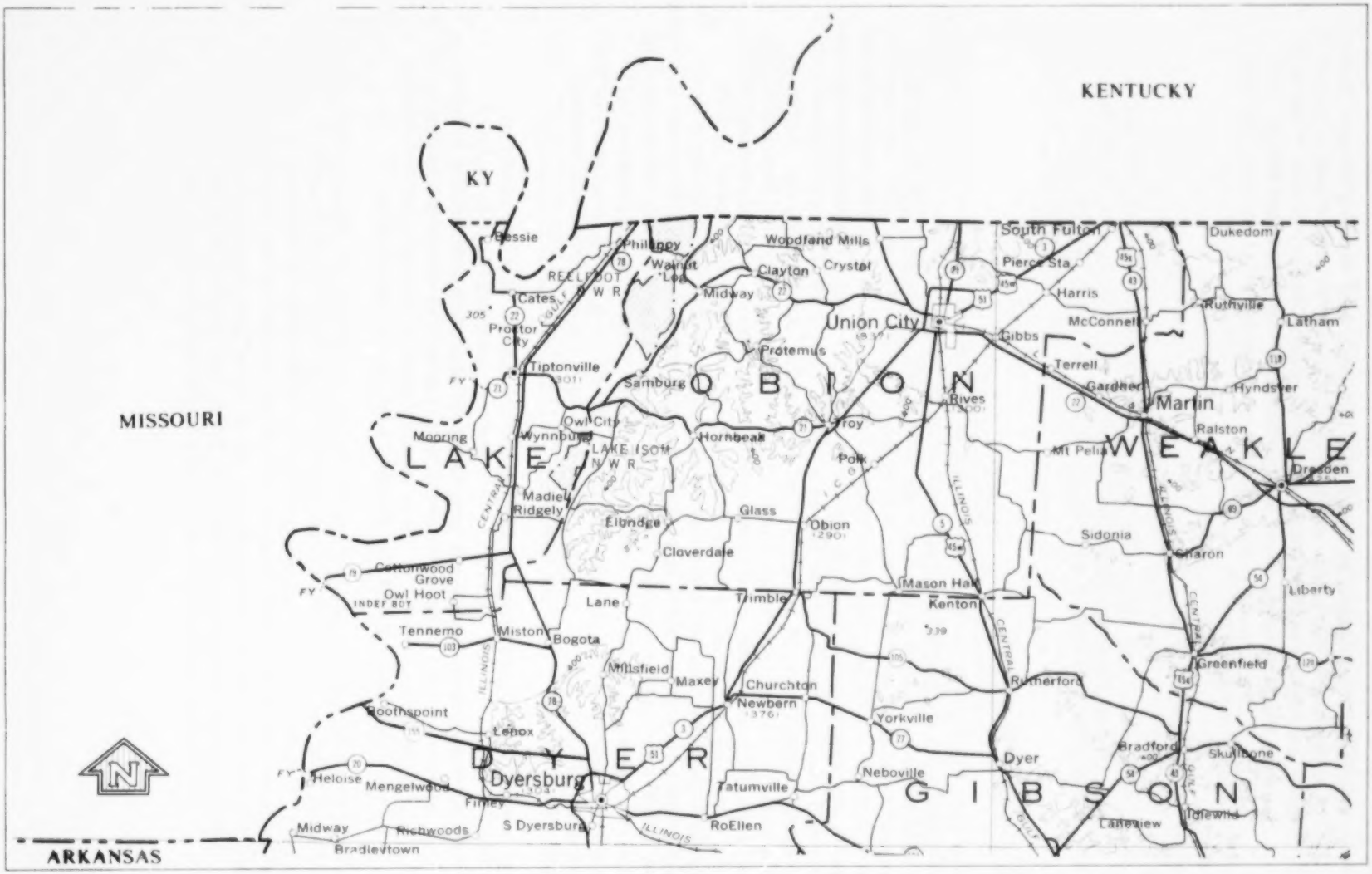


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

Federal Insurance Administration

# CITY OF TIPTONVILLE, TN

(LAKE CO.)

APPROXIMATE SCALE

8 0 8 16 24 MILES

## VICINITY MAP

### 2.3 Principal Flood Problems

The history of flooding in Tiptonville indicates that flooding is more likely to occur during the winter and spring (Reference 1). The floods in the study area are related to high stages on the Mississippi River. During these peak periods the Mississippi River waters inundate Old Graveyard Slough, Old Tramway Ditch, and the surrounding countryside, which includes portions of north Tiptonville.

### 2.4 Flood Protection Measures

The south part of Tiptonville is protected from the Mississippi River by the Tiptonville-Obion River backwater levee, which is part of the Mississippi River levee system.

## 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 3.1 Hydrologic and Hydraulic Analyses

Analyses of the hydrologic and hydraulic characteristics of the flooding sources studied in detail in the City of Tiptonville were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the flooding sources.

Backwater flooding along the Old Tramway Ditch was computed from the Mississippi River flood profiles (Preliminary, October 1978) furnished by the Memphis District of the COE. The flood stage corresponding to the 500-year flood was interpolated from the stage-frequency curve of the Mississippi River at Tiptonville.

The Reelfoot Lake flood elevations in the extreme northeast corner of the city were computed by statistical analysis of the 31 years of records from the gauging station on Reelfoot Lake near Tiptonville and by imposing Log-Pearson Type III distributtion on the historical peak stages (Reference 2).

Mississippi River backwater elevations and Reelfoot Lake elevations are described in Table I below.

TABLE 1 - SUMMARY OF ELEVATIONS

| FLOODING SOURCE AND LOCATION | ELEVATION ABOVE NGVD (feet) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|
| MISSISSIPPI RIVER | | | | |
| Near Tiptonville | | | | |
| (River Mile 872.5) | 287.2 | 292.5 | 294.3 | 296.0 |
| REELFOOT LAKE | | | | |
| At Lake Point | 285.0 | 286.3 | 286.9 | 288.2 |

All elevations are referenced from the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Mean Sea Level Datum of 1929. Elevation reference marks used in this study are shown and described on the Flood Insurance Rate map.

## 4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

### 4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined using the backwater flood elevations or lake shore elevations.

The boundaries were plotted using topographic maps at a scale of 1:7200 with a contour interval of 10 feet (Reference 3). In cases where the 100- and the 500-yea flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Insurance Rate Map (Exhibit 1). Small areas within the flood boundaries may lie above the flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topgraphic data, such areas are not shown.

### 4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights.

A floodway was not computed for this study since floodways are not appr-priate for ponding areas.

## 5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the City of Tiptonville.

### 5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

| Average Difference Between 10- and 100-Year Floods | Variation |
|---|---|
| Less than 2 feet | 0.5 foot |
| 2 to 7 feet | 1.0 foot |

In lacustrine areas, reaches are limited to the distance for which the 100-year elevation does not vary more than 1.0 foot. Two reaches meeting the above criteria were required for the flooding sources of Tiptonville. The locations of the reaches are shown on the Flood Insurance Rate Map (Exhibit 1).

## 5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

## 5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the City of Tiptonville was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

| | |
|---|---|
| Zones A4, A14: | Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs. |
| Zone B: | Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided. |
| Zone C: | Areas of minimal flooding. |

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

| FLOODING SOURCE | PANEL[1] | ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND | | | FHF | ZONE | BASE FLOOD ELEVATION[3] (NGVD) |
|---|---|---|---|---|---|---|---|
| | | 10% (10 YR.) | 2% (50 YR.) | 0.2% (500 YR.) | | | |
| Mississippi River Reach 1 | 0001 | -7.1 | -1.8 | +1.7 | 070 | A14 | 294 |
| Reelfoot Lake Reach 1 | 0001 | -1.9 | -0.6 | +1.3 | 020 | A4 | 287 |

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT – SEE MAP

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

# CITY OF TIPTONVILLE, TN

(LAKE CO.)

## FLOOD INSURANCE ZONE DATA

## MISSISSIPPI RIVER-REELFOOT LAKE

### 5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Tiptonville is, for insurance purposes, the principal result of the Flood Insurance Study. This map (Exhibit 1) contains the official delineation of flood insurance zones and base flood elevations. Base flood elevations show the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

## 6.0 OTHER STUDIES

A report, titled Flood Damage Potential for Tiptonville, Tennessee was published by the COE in December 1977 (Reference 4). This report included backwater flooding in Tiptonville from the high stages of the Mississippi River. Flood Profiles of the Mississippi River have been subsequently revised in October 1978 by the COE. The boundaries included in this Flood Insurance Study reflect those changes in the Mississippi River flood profiles.

The Flood Insurance Study for Lake County, of which Tiptonville is a part, coordinates with the results of this study.

## 7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, Pershing Point Plaza 1375 Peachtree Street, N.E. Atlanta, Georgia 30309.

## 8.0 BIBLIOGRPAHY AND REFERENCES


1. U.S. Army Corps of Engineers, Memphis District, Stages and Discharges of the Mississippi River and Tributaries in the Memphis District, 1939-1977.

2. U.S. Geological Survey, Water Resources Data for Tennessee, 1930-1977.

3. U.S. Geological Survey 7.5 Minute Series (Topographic Quadrangles), Ridgely (1964) and Tiptonville (1964).

4. U.S. Army Corps of Engineers, Memphis District, Tiptonville, Tennessee, Flood Damage Potential, December 1977.